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10/534,086	03/29/2007	David Lee Davidson	006832.00002	2388
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EXAMINER				
CHIANG, TIMOTHY S				
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1796				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/534,086

**Applicant(s)**

DAVIDSON ET AL.

**Examiner**

TIMOTHY CHIANG

**Art Unit**

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 March 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/CD)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-7, 10, 12-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Hsu et al. (US Patent 6,086,782 hereinafter "Hsu").

In regards to independent claim 1, Hsu discloses a heat transfer fluid composition comprising at least one terpene which is further disclosed to include menthane (a cycloalkane-alkyl) and 1,1-dimethylcyclohexane (abstract; Col. 8, table 2). Both said compounds used together are structurally non-identical cycloalkane-alkyl groups with alkyl moieties having between 1-10 carbons and meeting the limitations of instant claim 1a. Hsu further discloses the composition to remain at a liquid phase at least as low as -175°F (-84°C), and is only characterized to this temperature point due to limitations of testing apparatus (Col. 10, lines 21-24). Hsu further states that "it should be understood By one skilled in the art that the heat transfer fluid compositions of the invention may have, and in many instances do have, freezing point temperatures below -175°F (-84°C)" (col. 10, lines 26-29). In regards to the freezing (cloud point) temperature, vapor pressure at +175°C being below 1300 kPa, and viscosity at +10°C

being below 400 cP as taught in the instant claim, these physical properties are understood to be inherent to the heat transfer fluid composition.

The transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials or steps and those that do not materially affect the basic and novel characteristics of the claimed invention. MPEP § 2111.03, *In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976). Therefore, Hsu's teaching of alkyl benzene in composition does not preclude the reference as anticipatory if it is shown that the presence of alkyl benzene materially affects the basic and novel characteristics of the claimed invention.

In regards to instant claim 2, Hsu discloses the terpenes menthane and 1,1-dimethylcyclohexane as suitable components used in combination for heat transfer fluids (abstract; Col. 8, table 2) and meet the taught limitations of alkyl moieties of cycloalkane-alkyl being either methyl, ethyl, propyl, or mixtures thereof.

In regards to instant claim 3, The Applicant claims further limitations on species 1(b) of claim 1, which is not examined as a non-elected species of independent claim 1. The examiner elects to examine species 1(a), as shown above.

In regards to instant claim 4 and 5, Hsu discloses a heat transfer fluid composition comprising at least one terpene which is further disclosed to include menthane (a cycloalkane-alkyl) and 1,1-dimethylcyclohexane (abstract; Col. 8, table 2), and when used together are structurally non-identical cycloalkane-alkyl groups with alkyl moieties having between 1-10 carbons and meeting the limitations of instant claim 1a. Instant claims 4 and 5 teach the viscosity and vapor pressure of the taught

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composition of instant claim 1 to be below 300 cP and 827 kPa @ +175°C respectively.

The physical properties of viscosity and vapor pressure of the disclosed heat transfer fluid would be understood by one skilled in the art to be inherent to the composition.

In regards to instant claim 6, Hsu discloses the terpenes menthane (a cycloalkane-alkyl) and 1,1-dimethylcyclohexane (abstract; Col. 8, table 2), both of which meet the limitations of instant claim 6.

In regards to claims 7, 10, 12-14, the Applicant claims limitations drawn to species 1(b) or 1(c) of independent claim 1, non-elected for examination by the examiner.

In regards to claim 15, specifically the limitation in regards to the freezing (cloud point) temperature of the composition of from -110C to -175C, the physical properties are understood to be inherent to the heat transfer fluid composition as mentioned above.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 8-9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu as applied to claim 1 above, and further in view of Praller et al. (WO 01/92436 A1 hereinafter "Praller").

Hsu discloses a heat transfer fluid composition comprising at least one terpene which is further disclosed to include menthane (a cycloalkane-alkyl) and 1,1-dimethylcyclohexane (abstract; Col. 8, table 2). Both said compounds used together are structurally non-identical cycloalkane-alkyl groups with alkyl moieties having between 1-10 carbons and meeting the limitations of instant claim 1a. Hsu further discloses the composition to remain at a liquid phase at least as low as -175°F (-84°C), and is only characterized to this temperature point due to limitations of testing apparatus (Col. 10, lines 21-24). Hsu further states that "it should be understood By one skilled in the art that the heat transfer fluid compositions of the invention may have, and in many instances do have, freezing point temperatures below -175°F (-84°C)" (col. 10, lines 26-29). In regards to the freezing (cloud point) temperature, vapor pressure at +175°C being below 1300 kPa, and viscosity at +10°C being below 400 cP as taught in the instant claim, these physical properties are understood to be inherent to the heat transfer fluid composition. Hsu further discloses a composition "consisting of a mixture of d-limonene and cumene, wherein the composition consists of about 50% by volume of cumene in d-limonene" (col. 4, lines 8-10). D-limonene and cumene are both cyclic

terpenes usable in the disclosed heat transfer fluid. Hsu further discloses that the commercially available d-limonene in itself comprises 95.6% d-limonene and 2.7% myrcene by weight (col. 5, Table 1).

Hsu differs from the instant application in that, though Hsu discloses a composition of two cyclic terpenes similar in size and volume (d-limonene differs from cumene by an additional carbon atom) at a 1:1 volume ratio (col. 4, lines 8-10), and further discloses a 95.6:2.7 weight ratio between d-limonene and myrcene (col. 5, Table 1), Hsu does not specifically disclose the weight ratio range limitations of instant claims 8, 10-14. Further, in regards to instant claim 9 and 14, Hsu does not specifically disclose the cycloalkane-alkyl component as methylcyclohexane or ethylcyclohexane. Also further, Hsu does not disclose the limitations of aliphatic alkane components of the composition as taught by instant claims 7 and 14.

In regards to instant claims 8 and 11, the examiner construes the disclosure in Hsu on the composition "consisting of a mixture of d-limonene and cumene, wherein the composition consists of about 50% by volume of cumene in d-limonene" (col. 4, lines 8-10) as a weight ratio between two components of the heat transfer fluid applicable to other combinations of cycloalkane-alkyl components, aliphatic hydrocarbon components, or a mixture of cycloalkane-alkyl components and aliphatic hydrocarbon components given that the components in combination have comparable size. One skilled in the art would find obvious to consider 1:1 weight ratios of two-component heat transfer fluids and therefore, find obvious the weight ratio limitations of instant claims 9, 11.

In regards to instant claim 9, Hsu differs from the instant claims as the disclosed 1,1-dimethylcyclohexane compound does not meet the taught limitations of the instant claims. The reference differs from the instant application as little as the absence of one methyl group in the 1 position, or the substitution of the dimethyl group with an ethyl group.

MPEP 2144.09 states the following:

**2144.09 [R-6] Close Structural Similarity Between Chemical Compounds**

(Homologs, Analogues, Isomers)

**>I. < REJECTION BASED ON CLOSE STRUCTURAL SIMILARITY IS  
FOUNDED ON THE EXPECTATION THAT COMPOUNDS SIMILAR IN  
STRUCTURE WILL HAVE SIMILAR PROPERTIES**

A prima facie case of obviousness may be made when chemical compounds have very close structural similarities and similar utilities. "An obviousness rejection based on similarity in chemical structure and function entails the motivation of one skilled in the art to make a claimed compound, in the expectation that compounds similar in structure will have similar properties." In re Payne, 606 F.2d 303, 313, 203 USPQ 245, 254 (CCPA 1979). See In re Papesch, 315 F.2d 381, 137 USPQ 43 (CCPA 1963) (discussed in more detail below) and In re Dillon, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1991)

The prima facie case of obviousness is made in that the difference between the absence of one methyl group in the 1 position, or the substitution of the dimethyl group with an ethyl group on the 1,1-dimethylcyclohexane compound would not significantly alter the physical/chemical properties of 1,1-dimethylcyclohexane in its function in heat-transfer fluids.

In the same field of endeavor, Praller discloses a heat transfer fluid based on 2-methyl pentane and 3-methyl pentane (page 2, paragraph 3; claim 3). Also in the same field of endeavor. Paller is analogous art in that the disclosure of Paller is drawn to a heat transfer fluid for low temperature applications comprising cycloalkane-alkyl and aliphatic hydrocarbon components.



Hsu's disclosure on a heat transfer fluid composition comprising at least one terpene which is further disclosed to include menthane (a cycloalkane-alkyl) and 1,1-dimethylcyclohexane (abstract; Col. 8, table 2), combined with the 2-methyl pentane and 3-methyl pentane-based disclosure of Praller encompasses the instant claim 7 in its entirety.

### ***Response to Arguments***

6. Applicant's arguments filed 3/23/2010 have been fully considered but they are not persuasive.

The applicant argues that the prior art of reference Hsu discloses a fluid that does not disclose the compounds menthene and 1,1-dimethylcyclohexane as usable together in composition. This argument is not persuasive as Hsu clearly states that more than one terpenes disclosed in table 2 may be used presumably in combination with each other (col. 7, lines 56-60). Further, the Applicant's argument that Hsu requires alkyl benzene in composition which is not found in the instant invention and therefore does not anticipate the claims is non-persuasive.

Regarding applicant's argument regarding the transitional phrase "consisting essentially of", the transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials or steps and those that do not materially affect the basic and novel characteristics of the claimed invention. MPEP § 2111.03, *In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976). Therefore, Hsu's teaching of alkyl benzene in composition does not preclude the reference as anticipatory if it is

shown that the presence of alkyl benzene materially affects the basic and novel characteristics of the claimed invention.

Regarding Applicant's arguments pertaining to non-elected species 1(b) and 1(c) (claims 3, 7, 10, 12-14), the arguments are not persuasive as independent claim 1 allows for the examiner to elect for examination, the species 1(a), which is rejected over the prior art of reference above.

Regarding Applicant's arguments over cloud point, vapor pressure at 175C, and viscosity, the examiner finds the arguments non-persuasive as these claimed properties of the composition being claimed are inherent physical properties possessed by the claimed invention and the identical composition taught by Hsu.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TIMOTHY CHIANG whose telephone number is (571)270-7348. The examiner can normally be reached on Monday - Thursday 9:00AM-5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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5/19/2010